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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/782,554

02/19/2004

Brooke L. Small

210507US (4081-03900)

5152

37814

7590

12/08/2008

CHEVRON PHILLIPS CHEMICAL COMPANY

5601 Granite Parkway, Suite 750

PLANO, TX 75024

EXAMINER

NGUYEN, TAM M

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

12/08/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/782,554	Applicant(s) SMALL ET AL.	
	Examiner TAM M. NGUYEN	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/26/08.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-12, 20-29, 31-38, 46-54 and 56-67 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☒ Claim(s) 1-12, 20-29, 31-38, 46-54, and 56-67 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/26/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 26, 2008 has been entered.

Information Disclosure Statement

The information disclosure statement filed on 11/26/08 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because some of the references do not have a date. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claims 26-29 and 52-54 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The expression "the effluent comprises a **diluent**" in lines 1 of claims 26-29 and 52-54 renders the claims indefinite because these diluents are inconsistent with the diluent that already claimed in claims 1 and 36. If applicant intends to claim another diluent other than the diluent already claim in claims 1 and 35, the expression should be recited as --the effluent comprises a second diluent--. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-8, 10-12, 20, 22, 25, 35, 36, 37, 38, 46-50, 60-62, 64, and 67 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Culver et al. (US 6,534,691).

Culver discloses a process for producing alpha-olefins by contacting ethylene with an oligomerization catalyst system comprising iron and metal hydride in a continuous reaction zone. The catalyst system comprises a metal complex activated by a co-catalyst having a formula as in claim 10. The catalyst system is activated in the absence of ethylene. The reaction is operated at

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a temperature of from 35 to 80° C in the presence of a solvent such as 1-butene. Since the catalyst system of Culver is essentially the same as the claimed catalyst, it would be expected that the catalyst of Culver would comprise a selective 1-hexene catalyst as claimed. See abstract; col. 1, line 58 through col. 2, line 48; col. 3, lines 41-48; col. 8, lines 16-31;

It is noted that Culver does not specifically disclose a single pass conversion of ethylene as claimed and does not specifically disclose the composition of the product as in claims 3-6. However, the process of process of Culver is essentially the same as the claimed process in term of catalyst and feedstock. It would be expected that the process of Culver would have a conversion and a composition as claimed. In the event any different can be shown for the conversion and composition as opposed to the conversion and composition taught by Culver, such differences would have been obvious to one of ordinary skill.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 23, 24, 31, 56, 65, and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Culver et al. (US 6,534,691).

Culver discloses a process for producing alpha-olefins by contacting ethylene with an oligomerization catalyst system comprising iron and metal hydride in a continuous reaction zone. The catalyst system comprises a metal complex activated by a co-catalyst having a formula as in claim 10. The catalyst system is activated in the absence of ethylene. The reaction is operated at a temperature of from 35 to 80° C in the presence of a solvent such as 1-butene. Since the catalyst system of Culver is essentially the same as the claimed catalyst, it would be expected that the catalyst of Culver would comprise a selective 1-hexene catalyst as claimed. See abstract; col. 1, line 58 through col. 2, line 48; col. 3, lines 41-48; col. 8, lines 16-31;

Culver does not disclose that the fluid flow in the reactor has a Reynolds number of in the loop reactor is from about 200,000 to about 700,000 or from 300,000 to about 2,000,000 in a tubular reactor, and does not teach a step of manipulating product olefin distribution by controlling a pressure in the reaction zone.

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It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Culver by utilizing a Reynolds number as claimed because it is within the level of one of skill in the art to utilize any effective flow rate including the flow rate having the claimed Reynolds numbers.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Culver by controlling the pressure of the reaction zone to provide olefin distribution as claimed because it is known that operating conditions including pressure would affect the outcomes of a chemical process. It is within the level of one skill in the art to manipulating the olefin distribution by modifying the pressure of the reaction zone.

Claims 33, 34, 58 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Culver as applied to claims 1 and 36 above, and further in view of Takeda et al. (5,830,955).

Culver does not disclose a step of cooling the reactor with a coolant more volatile than water (e.g., butane or isobutane).

Takeda disclose a method of cooling a reactor by utilizing a coolant such as isobutane. See col. 9, lines 50-53; col. 10, lines 3-7.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Culver by using a coolant as taught by Takeda to cool the reactor.

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Claims 9, 21, 26-29 and 51-54, 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Culver as applied to claims 1 and 36 above, and further in view of De Boer et al. (US 7,049,442).

The process of Culver is as discussed above.

Culver does not specifically teach that the alkyl aluminum compound is tri-isobutyl Aluminum (TIBA), does not teach that the solvent is benzene or toluene, and does not teach that the catalyst comprises Cr or Ni.

De Boer discloses an oligomerization of ethylene by using a catalyst system comprising Lewis acid, TIBA, and a metal such as Co. Solvent such as benzene is employed in the process. De Boer further teaches that it is known in the art that the oligomerization catalyst comprises Cr or Ni. See col. 2, lines 25-48; col. 9, lines 40-49; col.10, lines 20-26.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified by utilizing TIBA as taught by De Boer because TIBA is one of alkyl aluminum compound which is known to be effective in the oligomerization process.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Culver by utilizing benzene as a solvent as taught by De Boer because benzene is known to be effective solvent in the oligomerization process.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Culver by utilizing a metal such as Cr or Ni as taught by De Boer because it is known that such metals are effective in the oligomerization catalyst.

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Claims 32 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Culver as applied to claims 1 and 36 above, and further in view of Culver et al. (US 7,053,259 B2) (hereafter Culver' 259).

Culver does not specifically disclose a step of injecting the feed and the catalyst at more than one point along the length of the reactor.

Culver' 259 discloses an oligomerization process of olefins wherein the feed and the catalyst at more than one point along the length of the reactor. See abstract; col. 3-4; col. 11, lines 54-62.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Culver by charging the feed and catalyst at multi-points as taught by Culver' 259 to maintain the ethylene concentration relatively steady over the length of the reactor.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TAM M. NGUYEN whose telephone number is (571)272-1452. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Tam M. Nguyen
Primary Examiner
Art Unit 1797

TN
/Tam M. Nguyen/
Primary Examiner, Art Unit 1797